

CIRCULATION COPY
SUBJECT TO RECALL
FOR FIVE YEARS

UCRL-94237
PREPRINT

Response of solid-state ion-selective
electrodes to quaternary
ammonium ions

Walter S. Selig

This paper was prepared for submittal to
J. Appl. Electrochemistry

March, 1986

Lawrence
Livermore
National
Laboratory

This is a preprint of a paper intended for publication in a journal or proceedings. Since changes may be made before publication, this preprint is made available with the understanding that it will not be cited or reproduced without the permission of the author.

DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

TECHNICAL NOTE

Response of solid-state ion-selective electrodes to quaternary ammonium ions

WALTER S. SELIG

Lawrence Livermore National Laboratory, University of California,
P. O. Box 808, Livermore, CA 94550, U. S. A.

Recently it was reported in this journal that bromide and thiocyanate ion-selective electrodes (ISE's) do not respond in Nernstian fashion to bromide and thiocyanate ions in the presence of quaternary ammonium ions [1]. We wish to draw attention to previous work [2] in which we found that the above-mentioned ISE's, as well as many others (including commercial chloride, iodide, cyanide, silver/sulfide, cadmium, cupric, and lead electrodes), can be used as sensors in the potentiometric titration of a variety of anions with quaternary ammonium halides. In addition, these ISE's can also be used as sensors in the reverse titration of quaternary ammonium ions vs anions such as dodecylsulfate. While the largest endpoint breaks were obtained with the iodide/cyanide ISE's, the thiocyanate and bromide electrodes yielded smaller, although sharp, endpoint breaks.

It is also noteworthy that the same solid-state ISE's, as well as some liquid-membrane electrodes, respond in the potentiometric titration of $Tl(I)$ with sodium tetraphenylborate [3].

The mechanism of these responses may be that stated by Khan and Reuben [1]. The users of ISE's should be aware that "ion-selective" electrodes may not be as selective as expected and may, indeed, respond to unexpected ions.

REFERENCES

- [1] S. A. Khan and B. G. Reuben, J. Appl. Electrochem. 15 (1985) 969.
- [2] W. Selig, Microchem. J. 25 (1980) 200.
- [3] W. Selig, Talanta 27 (1980) 914.

Work performed under the auspices of the U. S. Department of Energy by the Lawrence Livermore National Laboratory under contract number W-7405-ENG-48.